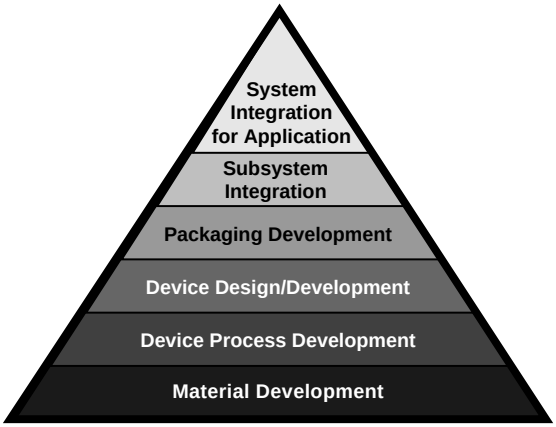
High-Bandwidth Photonics

An integrated approach to optical networks and interconnects for next-generation communication technologies

The world is witnessing an explosion in information communications that will require new technological solutions to meet future demands. Only the high bandwidth available from fiber optics and optical components promises to provide these solutions. With our integrated and flexible problem-solving approach for developing new cost-effective communications technology, we offer expertise at all layers of photonics technology. Our capabilities range from system demonstrations to device modeling and novel materials research. Our focus is on optical interconnects for local information processing and optical networks for longer distance communications. This work includes optoelectronic integrated circuits, board-to-board buses, and parallel processing. In optical networks, we focus on local-area networks and metropolitan-area networks.



LLNL has expertise at every level of photonics technology.

APPLICATIONS

- *National Information Infrastructure*
- *Climate and biological modeling*
- *Scientific and engineering visualization*
- *Machine vision and flexible automated manufacturing*
- *Video telephony*
- *In-home video education*
- *Surveillance*

Full-range of high-bandwidth photonics technologies

We have developed a suite of integrated technologies including:

- A testbed for high-speed interconnects that use wavelength-division, time-division, and sub-carrier multiplexing
- System-level networks and parallel computing demonstrations, including an "optical bus"
- Low-cost packaging techniques for state-of-the-art optoelectronic devices; Our packaging know-how makes use of microwave engineering, silicon micro-machining, and assembly automation
- High-bandwidth devices using III-V semiconductor materials and lithium niobate
- Subsystem and device modeling that dramatically reduces the costs of developing photonic technology
- New materials for optoelectronic applications such as flat-panel displays and all-optical switching.

Availability: Our expertise in photonics technology is available now, and we are actively looking for industrial partners with whom to further develop and apply the technology.

Contact

Mark Lowry
Phone: (510) 423–2924
Fax: (510) 422–1066
E-mail: mlowry@llnl.gov
Mail code: L-045